TFT, boron ions are introduced, using diborane (B_2H_6) as a dopant gas. As a result, a source region 113, a drain region 114, and a channel region 115 are formed in the active layer 107 by self-aligned technology. --

In the claims:

Please cancel claims 13, 26 and 29.

Please amend claims 2-7, 11, 12, 16-20, 24, 25, and 30 as follows:

2. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor island comprising silicon over a substrate, said semiconductor island comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region; and

a gate insulating film comprising a silicon oxide layer and a silicon nitride layer with said silicon nitride layer provided over said silicon oxide layer,

wherein said silicon oxide layer is provided over said crystalline semiconductor island and has a side aligned with a side of said crystalline semiconductor island,

wherein said crystalline semiconductor island has a ridge on a surface of said semiconductor island,

wherein said ridge is less than 500 Å over said channel

formation region,

wherein said channel formation region is crystallized by irradiating at least the channel formation region with laser light.

3. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon over a substrate, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region;

a gate insulating layer formed on said channel formation region, said gate insulating layer comprising silicon oxide layer;

a gate electrode provided adjacent to said channel formation region with said gate insulating layer therebetween, and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with KrF excimer laser light through said silicon oxide layer, and the thickness of said silicon oxide layer is from 300 to 600 Å.

4. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon over a

substrate, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region with at least one lightly doped region between said channel formation region and at least one of said source region and said drain region;

a gate insulating layer formed on said channel formation region, said gate insulating layer comprising silicon nitride layer;

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a gate electrode provided adjacent to said channel formation region with said gate insulating layer therebetween, and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with KrF excimer laser light through said silicon nitride layer, and the thickness of said silicon nitride layer is from 250-500 Å.

5. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region;

wherein said crystalline semiconductor layer has a ridge on

a surface of said crystalline semiconductor layer,

wherein said ridge is less than 500 Å over said channel formation region, and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with a laser light.

D2 Cancl'd

6. (Amended) The device of claims 5 wherein said ridge is formed by irradiating said laser light to at least the channel formation region.

D3

7. (Amended) The device of claim 5 wherein said laser light is KrF excimer laser or XeCl excimer laser light.

8. The device of claim 5 further comprising:

a gate insulating layer provided on said crystalline semiconductor layer: and

a gate electrode provided on said gate insulating layer.

9. The device of claim 5 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

10. The device of claim 5 wherein said ridge is less than about 200 Å.

11. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region,

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a drain region, and a channel formation region provided between said source region and said drain region; and

a gate insulating layer formed on said channel formation region, said gate insulating film comprising a silicon oxide layer; and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with XeCl laser light through said silicon oxide layer and the thickness of said silicon oxide is from 400-700 Å.

12. (Amended) The device of claim 11 wherein a ridge is formed on a surface of said crystalline semiconductor layer by

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irradiating said XeCl laser light to at least the channel formation region.

14. The device of claim 11 further comprising a gate electrode provided on said gate insulating layer.

15. The device of claim 11 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

D6

16. (Twice Amended) The device of claim 11 wherein the silicon oxide layer is formed by wet oxidation or hydrogen chloride oxidation.

D7

17. (Amended) The device of claim 12 wherein said ridge is less than about 200 Å.

D8

18. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region,

wherein said crystalline semiconductor layer has a ridge measured by AFM on a surface of said crystalline semiconductor layer,

wherein said ridge is less than 500 Å over said channel formation region, and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with laser light.

19. (Amended) The device of claim 18 wherein said ridge is formed by irradiating said laser light to at least the channel formation region.

20. (Amended) The device of claim 18 wherein said laser light is KrF excimer laser or XeCl excimer laser light.

21. The device of claim 18 further comprising:

a gate insulating layer provided on said crystalline semiconductor layer; and

a gate electrode provided on said gate insulating layer.

22. The device of claim 18 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

23. The device of claim 18 wherein said ridge is less than about 200 Å measured by AFM.

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24. (Twice Amended) A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region; and

a gate insulating layer formed on the channel formation region, said gate insulating layer comprising a silicon nitride, and

wherein said channel formation region is crystallized by irradiating at least the channel formation region with XeCl laser light through said silicon nitride layer and the thickness of said silicon nitride layer is from 350 to 600 Å.

D11

25. (Amended) The device of claim 24 wherein a ridge is formed on a surface of said crystalline semiconductor layer by irradiating said XeCl laser light to at least the channel formation region.

27. The device of claim 24 further comprising a gate electrode provided on said gate insulating layer.

28. The device of claim 24 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

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30. (Amended) The device of claim 25 wherein said ridge is less than about 200 Å measured by AFM.

31. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region; and

an insulating layer comprising silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge on a surface of said crystalline semiconductor layer,

wherein said ridge is less than 500 Å over said channel formation region, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer comprising silicon nitride is provided on said semiconductor layer, in order to suppress formation of said ridge.

32. The device of claim 31 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

33. The device of claim 31 wherein said ridge is less than about 200 Å.

34. The device of claim 31 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

35. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region; and

an insulating layer comprising silicon oxide provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge on a surface of said crystalline semiconductor layer,

wherein said ridge is less than 500 Å over said channel formation region, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer comprising silicon oxide is provided on said semiconductor layer, in order to suppress formation of said ridge.

36. The device of claim 35 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

37. The device of claim 35 wherein said ridge is less than about 200 Å.

38. The device of claim 35 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

39. The device of claim 35 wherein the silicon oxide later is formed by wet oxidation or hydrogen chloride oxidation.

40. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region; and

an insulating layer comprising silicon oxide or silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge measured by AFM on a surface of said crystalline semiconductor layer,

wherein said ridge is less than 500 Å over said channel formation region, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer is provided on said semiconductor layer, in order to suppress formation of said ridge.

41. The device of claim 40 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

42. The device of claim 40 wherein said ridge is less than about 200 Å by measured by AFM.

43. The device of claim 40 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

44. The device of claim 40 wherein the silicon oxide of said insulating layer is formed by wet oxidation or hydrogen chloride oxidation.